

wherein Ar<sup>1</sup> to Ar<sup>3</sup> are each independently an alkyl or aryl group which may have a substituent group, at least one of Ar<sup>1</sup> to Ar<sup>3</sup> is an aryl group which may have a substituent group, and at least one of Ar<sup>1</sup> to Ar<sup>3</sup> is a tert-butyl group.--

REMARKS

The claims are 1-4, 6 and 8-20. In response to the restriction requirement, Applicants affirm the election with traverse of Group I, claims 1-11 and acknowledge claims 12-20 have been withdrawn. In the event the claims of Group I are allowed, rejoinder of the claims of Group II under M.P.E.P. § 821.04 is requested. Such claims will be amended to be commensurate with Group I on rejoinder. The independent claims under prosecution are 1, 10 and 11. Claims 1, 10 and 11 have been amended to include the subject matter of claim 7. Reconsideration of the claims is expressly requested.

The Examiner objects to the specification at page 8 in use of the phrase "triphenylamine". In order to expedite prosecution, the specification has now been amended to change that term to --triarylamine--.

In addition, Applicants wish to correct a typographical error at page 9, lines 1-4 and in claim 6. In Formula (4) the bond for group R<sup>15</sup> is incorrectly attached at the

meta-position to the ring. The bond to R<sup>15</sup> should have passed to the center of the phenyl ring to indicate that the R<sup>15</sup> group can be bonded to any appropriate position. Support for the amendment is found, inter alia, on page 14, for compounds CT-1, CT-2, CT-9 and CT-10 in which the methyl group is in the para, not ortho, position. In CT-2 the methyl groups are in both meta- and ortho- positions.

The objection to claim 5 has been obviated by its cancellation. The objection to claim 6 has been obviated by the identification of the compound as a triarylamine. The objection to claim 8 has been obviated in accordance with the language kindly suggested by the Examiner. Withdrawal of the objections is respectfully requested.

Claims 1-4 were rejected as anticipated by Kobayashi '547. Claims 7-9 were rejected as anticipated by, or alternatively, as obvious over, Kobayashi. Claims 1, 2, 5 and 7 were rejected as anticipated by JP '261. Claims 3, 4, 8 and 9 were rejected as either anticipated by, or as obvious over, JP '261. Claims 1-5 and 7-9 were rejected as either anticipated by, or as obvious over, Sakakibara '022. Claims 1-11 were rejected as anticipated by, or as obvious, over Kikuchi '809. Claims 10 and 11 were rejected as obvious over Ohkubo '526, combined with Kobayashi. Claims 10 and 11 were rejected as obvious over Ohkubo, combined with JP '261. Claims 10 and 11 were also rejected as obvious over Ohkubo, combined with Sakakibara. The grounds of rejection are respectfully traversed.

Prior to addressing the grounds of rejection, Applicants wish to briefly review certain key features and advantages of the present claimed invention. On

specification page 31, lines 1-15, Applicants have disclosed that synthesis of the instant charge transfer compounds using the instant phosphine compounds and palladium compounds can (1) suppress the formation of impurities causing variations in potentials and (2) yield high-purity products.

On specification pages 3 and 4, it is disclosed that the synthesis of an arylamine compound employing an aryl halide and an amine compound in the presence of a copper catalyst (Ullmann reaction) requires a large amount of copper catalyst, a high reaction temperature and a prolonged reaction time, thereby resulting in a low arylamine yield and formation of excessive by-products, such as colored impurities and decomposition products. In the present specification on page 24, in Comparative Synthetic Example 1, compound CT-1 was synthesized using the Ullmann reaction. Test results using such CT compounds are found in Comparative Examples 1-20 in Table 4. The results clearly show unsatisfactory results in electrophotographic performance.

Accordingly, it is a feature of the present claimed invention that the triarylamine is synthesized employing as a catalyst a phosphine compound characterized, in part, wherein at least one of the substituent groups is a tert-butyl group. The specification teaches at page 10, lines 1-5, that it is preferable that at least one alkyl group is a tert-butyl group.

To the contrary, in Kobayashi '547 as illustrated in Example 9, for the synthesis of Exemplified Compound 21, the phosphine catalyst was a tri-ortho-tolyl phosphine. This catalyst does not have a tert-butyl group. The results in column 34 of

Kobayashi '547 for Exemplified Compound 21 show that the resulting photoreceptors were examined with an electrostatic recording paper tester. This tester is merely an estimator which provides an estimate of the initial electrophotographic characteristics of the member. Clearly, this test does not provide results which show whether electrophotographic characteristics would be satisfactory after any extended use. Applicants have demonstrated that the presence of contaminants in the triarylamine will adversely affect electrophotographic performance. In the absence of data, one can merely speculate whether such a Kobayashi catalyst would be satisfactory in providing a charge transfer material with high purity resulting in good endurance characteristics.

In JP '261 the triarylamine compound is obtained by employing tri-ortho-tolyl phosphine catalyst, as in Kobayashi. The reference employs an EPA 8100 tester for estimating charging characteristics. Accordingly, it is subject to the same defects as Kobayashi.

In Sakakibara '022, in column 11, it is disclosed that the amine compound is synthesized according to the Ullmann reaction. As explained on page 4 of the specification, this provides the structure of instant Comparative Examples 1-10. The Examiner should compare Examples 1-10 of the present invention with Comparative Examples 10-20 to see the defects of the member prepared with a charge transfer material synthesized by the Ullmann reaction. In addition, Sakakibara fails to teach or suggest the phosphine compound of formula 1. Finally, in Sakakibara an estimate of performance is conducted with an NP-150Z tester which employs a corona charge so that it does not

subject the member to the severe conditions of the contact charging method employed in the present invention. The same is true of Kobayashi '547 and JP '261, in which the tester utilized the corona charging method and, accordingly, one cannot determine whether the resulting member would provide satisfactory performance under the severe conditions of the contact charging of the present invention.

Kikuchi '809 is a patent assigned to the present Assignee. Accordingly, Applicants have actual knowledge that the triarylamine compound used therein was obtained utilizing the Ullmann reaction employing a copper catalyst corresponding to the structure of Comparative Examples 1-10. The reference fails to disclose the phosphine compound employed in formula I. In addition, the reference discloses estimating charge performance with NP-3525 system which employs a corona charge, rather than the more severe contact charge. Ohkubo '526 does not bear on the constant triarylamine compounds.

Accordingly, none of the primary references cited by the Examiner discloses the phosphine compound represented by formula I, nor the improved electrophotographic performance when subjected to more severe contact charging conditions.

Wherefore, Applicants submit that none of the references, whether alone or in combination, disclose or suggest the present invention nor render it unpatentable.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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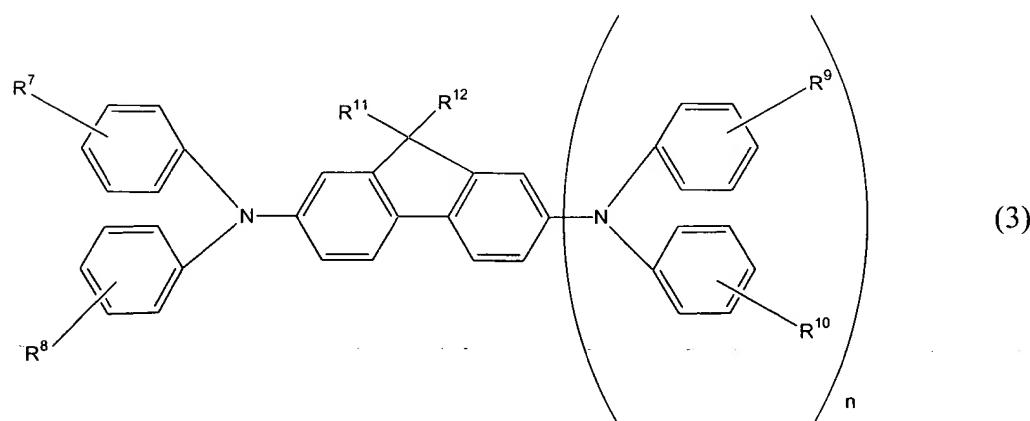
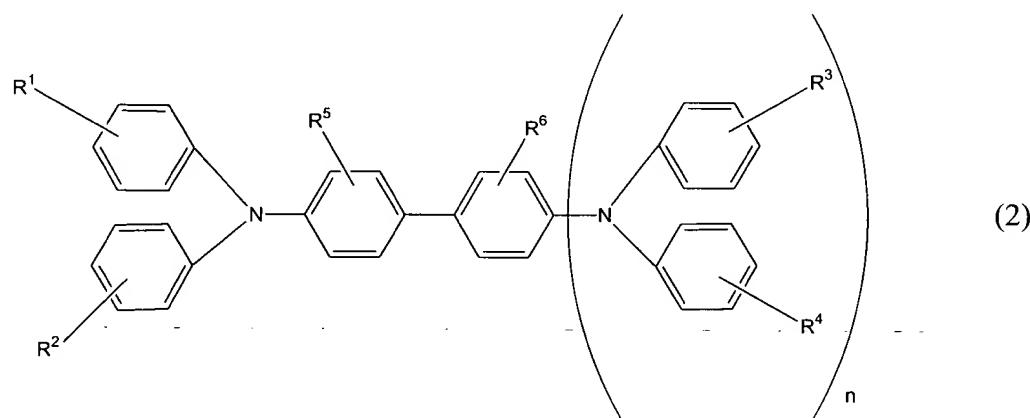
Appendix

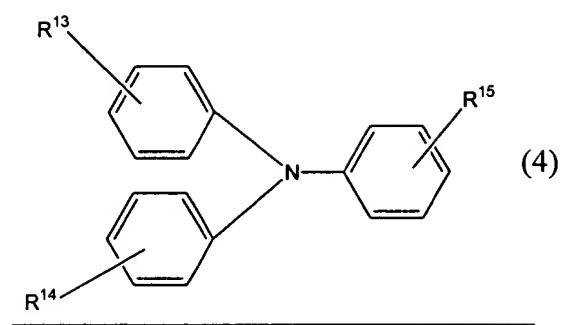
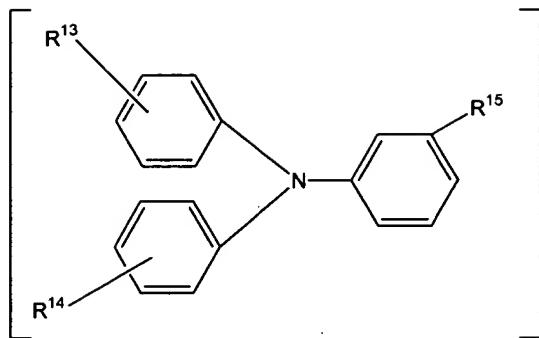
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Application No. 09/832,920  
Docket No. 03560.002771

VERSION WITH MARKINGS TO SHOW CHANGES MADE TO SPECIFICATION

--Preferably, the [triphenylamine] triarylamine compound is represented by formula (2), (3) or (4):



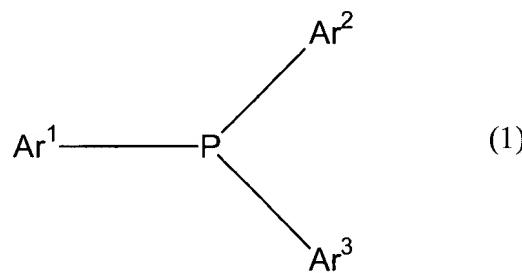


wherein R<sup>1</sup> to R<sup>15</sup> are each independently a hydrogen atom or an alkyl or alkoxy group

which may have a substituent group, or a halogen atom, and n is an integer of 0 or 1.

VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

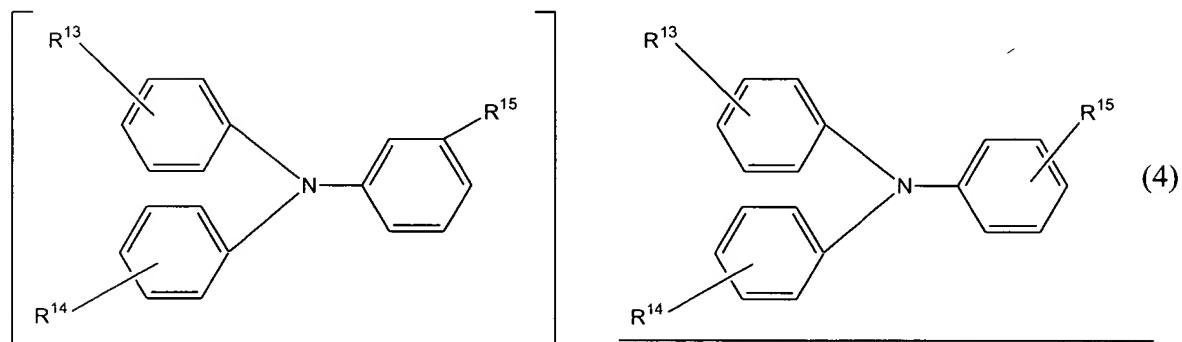
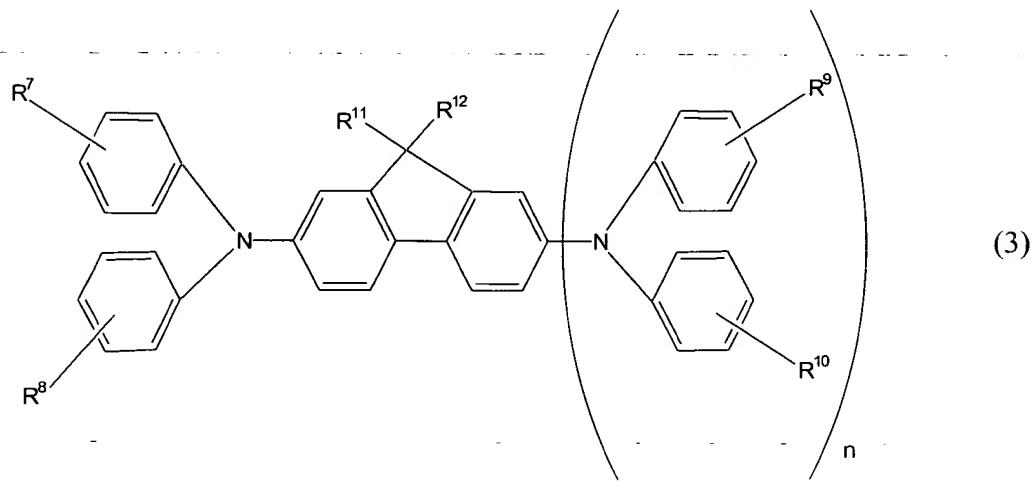
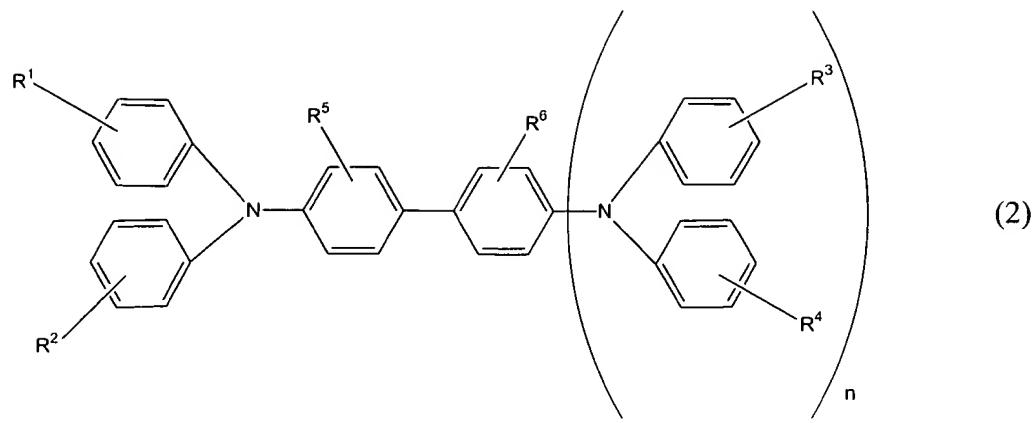
--1. (Amended) An electrophotographic photosensitive member comprising: a charge generating material and a charge transfer material, wherein the charge transfer material comprises a triarylamine compound synthesized from an amine compound and an aryl halide in the presence of a catalyst comprising a phosphine compound represented by formula (1) and a palladium compound:



wherein Ar<sup>1</sup> to Ar<sup>3</sup> are each independently an alkyl or aryl group which may have a substituent group, [and] at least one of Ar<sup>1</sup> to Ar<sup>3</sup> is an aryl group which may have a substituent group, and at least one of Ar<sup>1</sup> to Ar<sup>3</sup> is a tert-butyl group.

5. (Cancelled).

6. (Amended) An electrophotographic photosensitive member according to claim [5,] 1, wherein the [triphenylamine] triarylamine compound is represented by formula (2), (3), or (4):



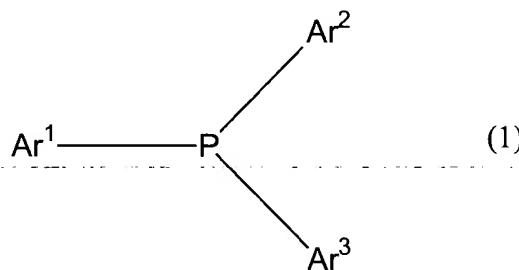
wherein R<sup>1</sup> to R<sup>15</sup> are each independently a hydrogen atom or an alkyl or alkoxy group

which may have a substituent group, or a halogen atom, and n is an integer of 0 or 1.

7. (Cancelled).

8. (Amended) An electrophotographic photosensitive member according to claim 1, wherein the phosphine compound [has] have a biphenyl group which may has at least one substituent group.

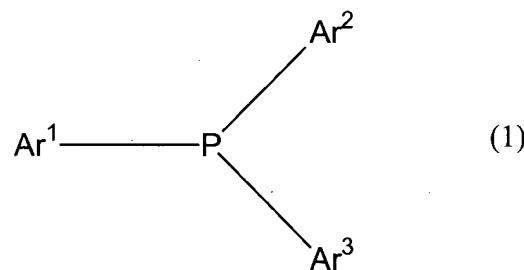
10. (Amended) A process cartridge comprising: an electrophotographic photosensitive member and at least one means selected from the group consisting of charging means for charging the electrophotographic photosensitive member, developing means for developing an electrostatic latent image formed on the electrophotographic photosensitive member with a toner, and cleaning means for recovering the toner remaining on the electrophotographic photosensitive member after a transfer step, the electrophotographic photosensitive member and said at least one means being integrated, and being attachable to and detachable from an electrophotographic apparatus body, the electrophotographic photosensitive member comprising a charge generating material and a charge transfer material, wherein the charge transfer material is synthesized from an amine compound and an aryl halide in the presence of a catalyst comprising a phosphine compound represented by formula (1) and a palladium compound:



wherein Ar<sup>1</sup> to Ar<sup>3</sup> are each independently an alkyl or aryl group which may have a substituent group, [and] at least one of Ar<sup>1</sup> to Ar<sup>3</sup> is an aryl group which may have a [substitute] substituent group, and at least one of Ar<sup>1</sup> to Ar<sup>3</sup> is a tert-butyl group.

11. (Amended) An electrophotographic apparatus comprising: an electrophotographic photosensitive member, charging means for charging the electrophotographic photosensitive member, exposure means for exposing the charged electrophotographic photosensitive member to form an electrostatic latent image, developing means for developing the electrostatic latent image formed on the electrophotographic photosensitive member with a toner, and transfer means for transferring the toner image formed on the electrophotographic photosensitive member onto a transfer member,

the electrophotographic photosensitive member comprising a charge generating material and a charge transfer material, wherein the charge transfer material has a triarylamine structure and is synthesized from an amine compound and an aryl halide in the presence of a catalyst comprising a phosphine compound represented by formula (1) and a palladium compound:



wherein Ar<sup>1</sup> to Ar<sup>3</sup> are each independently an alkyl or aryl group which may have a substituent group, [and] at least one of Ar<sup>1</sup> to Ar<sup>3</sup> is an aryl group which may have a [substitute] substituent group, and at least one of Ar<sup>1</sup> to Ar<sup>3</sup> is a tert-butyl group.

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